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**GB 2245667 A GB 0694905 A EP 0267561 A1**

(58) Field of Search

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**INT CL<sup>6</sup> B23P 15/18 , F16D 69/04**

**Online:WPI**

## (54) Backplate for friction material

(57) A backplate 10 for friction material is made of cast metal and comprises a plurality of projections 12 cast integrally therewith. The projections (12) are distributed across a friction material-receiving surface 14 of the backplate 10 and each projection tapers in a direction away from the remainder of the backplate. The projections may be pyramidal, conical, or frusto-conical, and may be distributed at 4 to 9 per cm<sup>2</sup>. Each projection may be 1 to 3 mm in height, and may cover an area of 2 to 8 per mm<sup>2</sup>. The backplate may be cast from iron or aluminium.

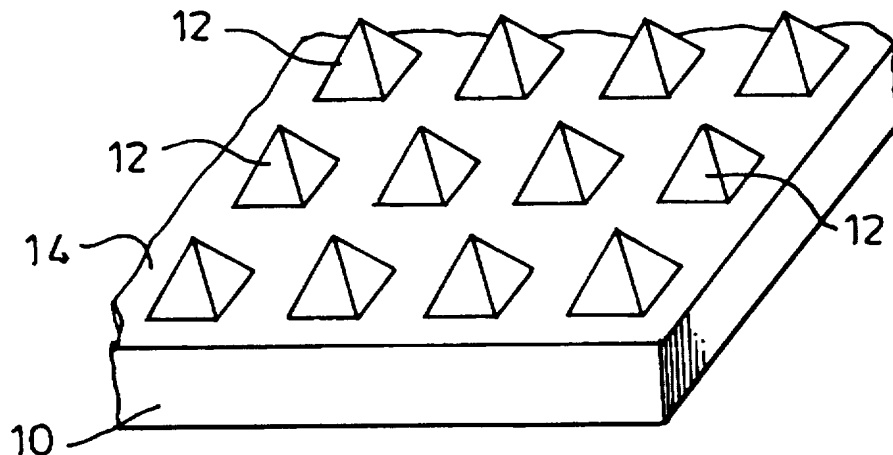


FIG.1

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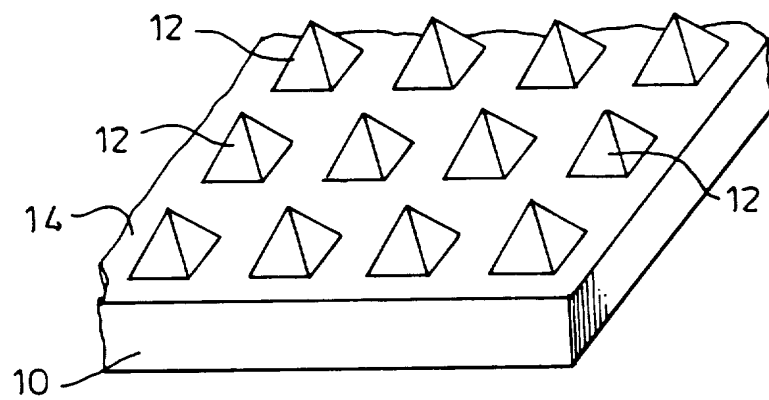


FIG. 1

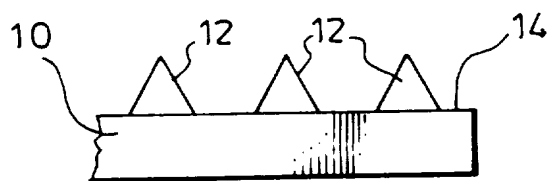


FIG. 2

### BACKPLATE FOR FRICTION MATERIAL

This invention is concerned with backplates for friction material.

A conventional brake pad for use, for example, in a disc brake of a vehicle comprises a pad of friction material mounted on a backplate. The backplate is conventionally made of rolled steel and defines a small number of holes (spigot holes) which can be entered by friction material to key the material to the backplate. The backplate is placed across a cavity containing particulate friction material and curable resin and the particles are pressed into a pad against the backplate. The resin is subsequently cured to give the pad strength. During the pressing operation, the material enters the spigot holes so that, in service, the material in these holes resists the friction material being sheared away from the backplate.

Various attempts have been made to improve the keying of the friction material to the backplate. For example, it is known to apply metal powder to the backplate and sinter the powder to form a porous layer into the interstices of which the friction material can enter. Another known possibility is to weld a piece of expanded metal mesh to the backplate so that the mesh becomes embedded in the friction material. These possibilities, although they improve the keying, are complex to manufacture.

DE 26 29 793 A describes a backplate which is made from cast iron instead of rolled steel. One advantage

claimed for the use of this material is that the friction material adheres well to the rough cast surface. However, this publication does not suggest that the keying can be improved by casting any features into the backplate.

It is an object of the present invention to provide a backplate with improved keying which is not complex to manufacture.

The invention provides a backplate for friction material which is made of cast metal, the backplate having a generally planar friction material-receiving surface, the backplate comprising a plurality of projections distributed across and projecting from the friction material-receiving surface, the projections being cast integrally with the remainder of the backplate, each projection tapering in a direction away from the remainder of the backplate.

In a backplate according to the invention, the projections can be easily cast and project into the friction material forming a good key. This makes the conventional spigot holes unnecessary improving resistance to water penetration and also improving the homogeneity of the friction material which does not have to flow into the spigot holes. Furthermore, the tapering of the projections is found to reduce the tendency of the friction material to delaminate from the backplate by deflecting cracks from the plane of the interface between backplate and the friction material. This advantage would not be obtained by providing, for example, indentations in the backplate. The backplate is, preferably, cast from iron but aluminium and other metals are possible.

Preferably, the projections are distributed in a regular pattern, eg a rectilinear pattern, over the area of the backplate occupied by the friction material.

It is found to be advantageous if the projections project by 1mm to 3mm from the remainder of the backplate. For example, the projections may project 2mm.

Preferably, each projection occupies an area of 2 to 8 square millimetres. For example, the projections may be in the form of pyramids or may be conical or frustoconical. For example, the height of each projection may be substantially equal to the distance through its base so that it has its sides inclined at approximately 67 degrees.

The projections may be distributed at between 4 and 9 to the square centimetre.

The backplate may be given an anti-corrosion treatment before the friction material is applied thereto. Such treatment may comprise dipping the backplate in a phosphate bath.

There now follows a detailed description, to be read with reference the accompanying drawings, of a backplate which is illustrative of the invention.

In the drawings:

Figure 1 is a perspective view of the illustrative backplate; and

Figure 2 is a side elevational view of the illustrative backplate.

The illustrative backplate 10 is for frictional material and is made by a conventional casting technique from cast iron. The backplate 10 is of conventional form except that it comprises a plurality of projections 12 distributed across a generally planar friction material-receiving surface 14 of the backplate 10.

The projections 12 are cast integrally with the remainder of the backplate and are distributed across the surface 14 in a regular rectilinear pattern.

Each projection 12 is in the form of a pyramid which has a square base of 2mm on a side and is 2mm high. Thus, each projection 12 tapers in a direction away from the remainder of the backplate 10 and projects into the friction material by 2mm. Each projection occupies an area of 4 square millimetres.

The projections 12 are spaced 2mm apart so that there are on average approximately 6.5 projections per square centimetre.

The backplate 10 was used in a conventional pressing and curing process to form a brake pad for a disc brake. The friction material was found to be well keyed to the backplate 10 and required more force to shear it off the backplate than was required for a conventional rolled steel backplate.

**CLAIMS**

- 1 A backplate for friction material which is made of cast metal, the backplate having a generally planar friction material-receiving surface, the backplate comprising a plurality of projections distributed across and projecting from the friction material-receiving surface, the projections being cast integrally with the remainder of the backplate, each projection tapering in a direction away from the remainder of the backplate.
- 2 A backplate according to claim 1, wherein the projections are distributed in a regular pattern.
- 3 A backplate according to either one of claims 1 and 2, wherein the projections project by 1 to 3mm from the remainder of the backplate.
- 4 A backplate according to any one of claims 1 to 3, wherein each projection occupies an area of 2 to 8 square millimetres.
- 5 A backplate according to any one of claims 1 to 4, wherein the projections are in the form of pyramids.
- 6 A backplate according to any one of claims 1 to 4, wherein the projections are conical or frustoconical.
- 7 A backplate according to any one of claims 1 to 6, wherein the projections are distributed at between 4 and 9 to the square centimetre.
- 8 A backplate substantially as hereinbefore described with reference to and as shown in the accompanying drawings.



Application No: GB 9604477.1  
Claims searched: 1-8

Examiner: Peter Squire  
Date of search: 29 April 1996

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK Cl (Ed.O): F2E EHB EHA F2C B3A  
Int Cl (Ed.6): B23P 15/18 F16D 69/04  
Other: Online:WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2245667 A (Ferodo)	1
X	GB 0694905 (Soc. Pompes Noel) see e.g. page 1 lines 21-26 and claim 1	
A	EP 0267561 A1 (ZWN)	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.